Identification of dorsal and ventral surface of rubber seed using image processing and machine learning approach

ABSTRACT

Natural rubber tree is one of major plantation crops in Malaysia. To increase the production and germination of the rubber, proper placement of seeds is needed. Ventral surface of rubber seed needs to be placed downward attached to the soil. Nowadays, it is necessary to use an automatic detection technology in order to reduce labor intensity and improve the production efficiency. Therefore, this study was conducted to identify the dorsal and ventral surface of rubber seeds using image processing and machine learning approach. Canny edge detection was used to identify features at the center of the seed namely maximum length of detected edge, ratio major and minor axis, number of pixel, maximum convolution, and number of intersection. These features were used as the input parameters in classifying the dorsal and ventral surface at horizontal position. A new prediction model using decision rule was developed for identification of the dorsal and ventral surface. Support Vector Machine (SVM) and Artificial Neural Network (ANN) were also used for the classification. Based on the results, a new prediction model gave the best percentage of classification with 83.5% successful compared to ANN (67.9%) and SVM (61.5%).

Keyword: Image processing; Edge detection; Rubber seed; Decision rule; Artificial Neural Network; Support Vector Machine